A Critical Evaluation of Factors Required To Terminate the Post-Closure Monitoring Period at Solid Waste Landfills

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Introduction

Regulations governing the disposal of solid waste in landfills in the U.S. specify that they must be monitored for thirty years after closure unless this period is extended by the governing regulatory authority. While time periods for post-closure monitoring are not always specified in other countries, the issue of long-term landfill management must be addressed on a global-scale. Given the wide range of conditions under which refuse is buried, technical criteria, rather than a specific time period, are preferable for evaluation of when it is acceptable to terminate post-closure monitoring.

The objectives of this project were to identify and evaluate parameters that can be used to define the end of the post-closure monitoring period and to present a conceptual framework for an investigation of whether post-closure monitoring can be terminated at a landfill. Parameters evaluated include leachate composition and leachate and gas production. Initially, data were reviewed to develop estimates of leachate composition and hypothetical liner leakage rates from closed landfills containing well decomposed refuse. These estimates of leachate production from closed landfills were then used to assess the potential environmental impacts of a hypothetical release to surface water and groundwater. For surface water, the Streeter-Phelps dissolved oxygen sag model was modified to include oxygen demand associated with both BOD and ammonia. For groundwater, a simple model was developed to evaluate whether the oxygen demand associated with a hypothetical leachate release could be met by the receiving aquifer.

With respect to gas management, strategies will differ dependent upon whether a landfill has an active, passive or no gas collection system. In the case of a passive collection system, or the absence of any collection system, no additional decisions are required. For landfills with an active gas collection system, a decision must be reached on when the system can be turned off. The acceptability of gaseous releases should be evaluated against criteria for odors, the potential for subsurface migration, and greenhouse gas and ozone precursor emissions.

The approach developed emphasizes potential environmental impacts associated with landfills including impacts to groundwater, surface water, air quality and human health. For many landfills, it may be most appropriate to reduce the frequency and extent of post-closure monitoring as warranted by site-specific data and impact analysis, as opposed to completely terminating post-closure monitoring. For example, if leachate production is not-detected, then regular inspection of the landfill cover to insure the absence of cracking can be used to eliminate the potential for increases in leachate production in the future. Ultimately, it is essential to prepare both regulators and the regulated community for the large number of requests to terminate post-closure monitoring expected over the next twenty years.

Questions

Is the use of potential environmental impact a useful criteria for the long-term management of landfills? If not, what is a better approach?

If it can be demonstrated that there are no potential impacts, then is it acceptable to terminate post-closure monitoring?

For how many years must a cap be inspected before one can conclude that it is stable?

References

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